

App. No. 09/995,759
Amdt. Dated November 14, 2005
Reply to Office action of August 23, 2005
Attorney Docket No. P13576-US1
EUS/J/P/05-1305

Amendments to the Drawings:

The attached five (5) sheets of drawings include changes to Figures 1, 2a, 2b, 3 and 6.

A Submittal of Drawing Replacement Sheets is filed concurrently herewith under separate cover. For the Examiner's convenience, a copy of that filing is attached.

Attachment: Copy of Submittal of Drawing Replacement Sheets

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REMARKS/ARGUMENTS

1.) Claim Amendments

Claims 2, 13-16, 19, 24-27, 32 and 33 have been amended, and claim 1 has been cancelled. Claims 2-8, 10-22, 24-30 and 32-33 remain pending in the application. Favorable reconsideration of the application is respectfully requested in view of the foregoing amendments and the following remarks.

2.) Examiner Objections – Drawings

The Examiner objected to the drawings as not showing every feature of the invention specified in the claims, and suggested that descriptive language be used in the figures to identify each element.

The Applicant has amended Figures 1, 2a, 2b, 3 and 6 to include text labels for each block element, and has amended certain corresponding portions of the specification to include corresponding acronyms related to element names previously existing in the specification; no new matter has been added to either the figures or specification. The Examiner's approval of the amended drawings is respectfully requested.

With respect to the Examiner's statement that the drawings must show every feature of the invention specified in the claims, the Applicants respectfully assert that the drawings, as required under 37 C.F.R. §1.83(a), show all necessary features "unless their detailed illustration is not essential for a proper understanding of the invention."

First, the Examiner asserts that the claimed feature "means for cyclically rotating the inverse discrete Fourier transformed sequence" is not illustrated. The Applicant, however, directs the Examiner's attention to Figure 3 and the description relating thereto, wherein it is described how the output of Inverse Fast Fourier Transformer 308 is fed to element 381 for cyclic rotation; i.e., the combination of elements 308 and 381 form such means for cyclically rotating an inverse discrete Fourier transformed sequence.

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Second, the Examiner also recommends that a flowchart be provided to illustrate the claimed method steps. Whereas those of ordinary skill in the art can readily understand the structure and operation of the claimed invention in view of the illustrated elements, particularly in Figures 3 and 6, and the description reciting the processes performed by each element and the signals there between, the Applicant does not believe any additional figures are desirable, much less required.

The Examiner's approval of the amended drawings is respectfully requested.

3.) Examiner Objections – Specification

The Examiner objected to the specification as failing to provide proper antecedent basis for the claim element "means for cyclically rotating the inverse discrete Fourier transformed sequence." As noted *supra*, that aspect of the claimed invention is illustrated in, and described with reference to, Figure 3, wherein it is described how the output of Inverse Fast Fourier Transformer 308 is fed to element 381 for cyclic rotation; *i.e.*, the combination of elements 308 and 381 form such means for cyclically rotating an inverse discrete Fourier transformed sequence. Accordingly, the Applicant traverses the Examiner's objection to the specification.

4.) Examiner Objections - Claims

The Examiner objected to claims 1-8, 10-22, 24-30, 32 and 33 for various informalities. Claim 1 has been cancelled and, therefore, the Examiner's objection thereto is moot.

The Examiner objected to, and requested the meaning of, the phrase "a number of predetermined steps" recited in claims 1, 16, 24, 32 and 33. Those claims have been amended to more particularly point out and distinctly claim the subject matter that Applicant regards as the invention. The amended claim elements now correspond more precisely to the description thereof, at page 14, line 11 *et seq.*, where it is stated that "the sequence $p(n)$ is cyclically rotated by a predetermined step comprising a predetermined number n' of positions in the sequence . . ." Thus, "a number of

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predetermined steps" refers to the n' steps, wherein the sequence $p(n)$ is cyclically shifted.

With respect to claims 5 and 20, the Examiner has asked the meaning of "the distance between each step is greater than a delay spread." As provided in paragraph 0070: "a commonly used constraint in OFDM is that the cyclic prefix length should be slightly longer than the longest duration of a channel impulse, i.e. delay spread . . ." and "[p]rovided that the number of cyclic positions shift n' between the two antenna paths is greater than the length of the cyclic prefix CP, the channel impulse responses h_{11} and h_{21} are guaranteed to be extracted individually from a composite channel impulse response estimate h_{comp} ." From that disclosure, those skilled in the art will recognize that the distance between each step is greater than the delay spread.

With respect to claim 6, the Examiner has asked the meaning of "separated regions." With reference to Figure 4, it is provided in paragraph 0070 that channel impulse response estimates (h_{11} , h_{21}) can be extracted individually. Figure 4 illustrates that h_{11} and h_{12} have a large magnitude in different regions of the composite channel impulse response. That the channel impulse response estimates occur in different regions, i.e. are non-overlapping, is further elaborated in paragraphs 0072-0077 where a plurality of fixed ranges is defined for the regions where the channel impulse response estimates are strongest. A range is the portion cut out from a region where a channel impulse response occurs in the composite channel impulse response.

With respect to claims 8, 22 and 30, the Examiner has asked the meaning of "fixed predetermined ranges." With reference to Figure 4, it is provided in paragraph 0072 that "[a]ccording to the first method, a plurality of fixed ranges is defined in the discrete time domain. The number of fixed ranges is equal to the number of transmit antennas and are upper limited to floor (N/CP duration)...."

With respect to claim 10, the Examiner has asked the meaning of "operating method of primarily equalizer and FEC decoder." it is provided in paragraph 0088 that "[d]epending of the operation with respect to time or frequency in the decoding/demodulation block 634, it should be noted that often a frequency domain representation of the channel may be more suitable than the time domain oriented

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channel impulse response. Block 634 may for example use a frequency domain equalizer prior Forward Error Correction decoding. Alternatively, block 634 may incorporate frequency domain channel state information in a Viterbi decoder's path metric when convolutional coding is employed. "

Finally, the Examiner also suggested amendments to claims 16, 25, 26, 32 and 33. The Applicant has amended those claims as suggested by the Examiner. The Applicant has also amended claims 16 and 32 to more clearly show that those claims are directed to systems and not methods.

5.) Claim Rejections – 35 U.S.C. §112

The Examiner rejected claims 13-15, 19 and 27 as being indefinite, noting the lack of antecedent basis for certain claim terms. The Applicant has amended each of those claims to overcome the lack of antecedent basis. The Examiner's consideration of the amended claims is respectfully requested.

6.) Claim Rejections – Double Patenting

The Examiner objected to claims 1, 32 and 33 as being substantial duplicates of claims 2, 16 and 24 respectively. Claim 1 has been cancelled and, therefore, the Examiner's rejection thereto is now moot. With respect to claims 16 and 32, and 24 and 33, there are substantive differences between those claims and, thus, the Applicant declines to cancel any of those claims. It should be noted that claims 16 and 24 include limitations dependent on an Inverse Discrete Fourier Transformed sequence, while claims 32 and 33 include limitations dependent on an Inverse Fast Fourier Transformed sequence; the distinction is intended. The Applicant, therefore, respectfully requests that the Examiner withdraw the objection.

7.) Allowable Subject Matter

The Examiner stated that claims 2-8, 10-22 and 24-30 would be allowable if amended to overcome the stated objections and §112 rejections. The Applicant thanks the Examiner for the recognition of allowable subject matter. The Applicant has

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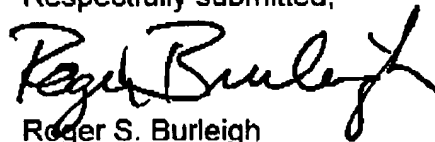
amended the claims as described *supra*. Accordingly, the Applicant believes those claims are now allowable.

CONCLUSION

In view of the foregoing amendments and remarks, the Applicant believes all of the claims currently pending in the Application to be in a condition for allowance. The Applicant, therefore, respectfully requests that the Examiner withdraw all rejections and issue a Notice of Allowance for claims 2-8, 10-22, 24-30 and 32-33.

The Applicant requests a telephonic interview if the Examiner has any questions or requires any additional information that would further or expedite the prosecution of the Application.

Respectfully submitted,



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Date: November 14, 2005

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